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ANTHROPOLOGICAL NEWS.—A German treatise of Ernst Kuhn "on the origin and languages of the transgangetic nations" was published in the Transactions of the Bavarian Royal Academy (1883, pp. 22, 4to), and gives a lucid sketch of racial and linguistic facts observed in China and Indo-China by recent investigators. Kuhn thinks that the autochthonic population of the Indo-Chinese peninsula are the people of Annam, Kambodja and Pegu, and that the intruders who drove them to the coast, came originally from Western China, like the Tibetans; that the monosyllabism of all these languages is not original, but only the result of condensation of a former polysyllabic status; that the Tibetan language has retained the most Arabic forms of the western group of dialects; that the Kambodja is not a Malayan language, as it has been asserted by Aymonier and Keane; that the series of numerals proves ancient affinity of Chinese with Barma (Burmese), Siamese, Lepcha and Tibetan.—— The Lord's Prayer, translated by E. H. Man into the South Andamanese language, has been fully commented by R. C. Temple, and edited by him with a scientific preface and introduction on that curious agglutinative language, which had never been previously investigated in a philosophic manner.——The interpretation of the local names of Celtic origin in France, Germany and Italy forms a *crux interpretum* of a peculiar kind for local etymologists, for the simple reason that the ancient Celto-Gallic language and its dialects is almost entirely lost to us. It has been preserved in about twenty or thirty short inscriptions only, which are very differently translated by the scientists, and in a considerable number of personal, tribal and local names, most of which are just as enigmatic as the above inscriptions. The coeval languages of the Greeks and Romans, Oscans and Umbrians being of the same linguistic family, some light is thrown upon the Celtic from that quarter. Dr. Quirinus Esser, inspector of schools at Malmedy, Prussia, has brought to bear all the resources of modern linguistics upon the elucidation of these local names of Middle Europe, as Ruhr, Rezat, Gürzenich, Kanzach, Créteil, Doubs, &c., through the historical method, in his Beiträge zur gallo-keltischen Namenkunde, Malmedy, 1884, pp. 128. Another series of local names, Celtic and Romanic, were learnedly investigated by the same author in a series of articles published in the *Kreisblatt für Malmedy*, at St. Vith, the county seat.—*A. S. Gatschet.*

## MICROSCOPY.[1]

THE DIOPTROGRAPH.[2] — The dioptrograph is a mechanical drawing apparatus adapted to drawing the outlines of macroscopic objects. It consists of a pantograph (in which the tracer is represented by a tubular diopter) supported on a square table.

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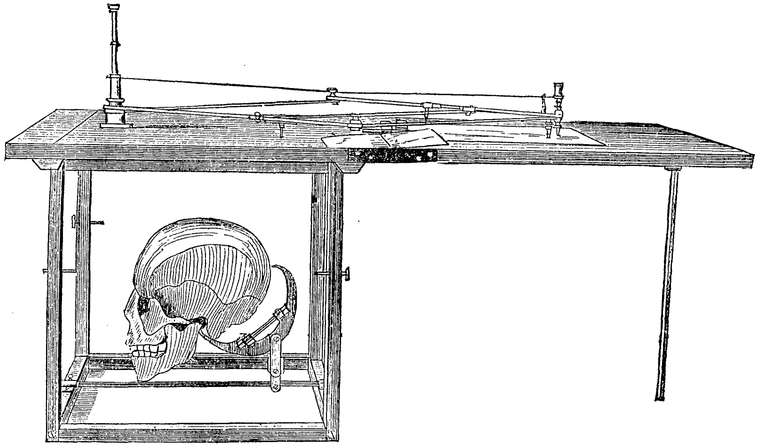
[1] Edited by Dr. C. O. WHITMAN, Mus. Comparative Zoology, Cambridge, Mass.

[2] F. Kinkelin, Humboldt, 1, Part 5.

By shifting the position of the diopter (sight vane) on a mirror glass plate, the eye can follow the outlines of the object placed below the glass as they appear at the intersection of the cross-wires contained in the diopter. The table is supported by four square wood frames which together bound a cubical area, as shown in the figure. A pane of glass, fitted with a frame, represents the upper surface of the cube, while the five other sides are open so as to admit of the frame with the plate being placed upon any side of the cube. On the lower frame Schroeder's steel pincers are fitted, by means of which the object may be placed in such a position as to be completely detached and visible from all sides. These pincers firmly grasp the object; this is effected by fastening a screw and by three sharp points. The axis of the pincers has a bilateral clamping movement, which may be regulated by means of a screw; then there is a round bar fixed on two opposite sides of the lower frame, on which a vertical rotation of the axis of the pincers and a horizontal sliding movement of the object can take place. Lastly there is a conical pin, adjustable by means of a special screw and admitting of a horizontal rotation of the object. The drawing-board, which is connected with the table by means of hinges, can be folded down upon the glass plate of the table.



In the figure the pantograph, consisting of the diopter and pencil connected by a frame-work for mechanical adjustment, is represented in position for drawing. The drawings may be made of natural size, or they may be enlarged or reduced, according to the proportions required.

For the use of tourists a folding instrument is made. In this instrument objects are placed on three pins, which can be adjusted at the bottom according to requirements.

For the geometric drawing of smaller objects the following appliances are used:

1. One object-plate, which is placed below the glass plate and which, by means of an arm, may be moved up and down on one side of the cube. Upon this plate a small object imbedded in clay or any other suitable substance may be placed.
2. A tubular diopter furnished with a lens.

PRICES.

| | |
|---|---|
| A. Folding dioptrograph of polished mahogany for tourists....... | $70 00 |
| B. Same as A, but not polished and without case................. | 55 00 |
| C. Same as A, but not folding (like the figure here given)........ | 72 50 |
| D. Same as C, not polished.................................... | 62 50 |

The instrument is made by Luckhardt & Alten, in Cassel, Germany.

OPALINA.[1]—The life-history of this very interesting parasitic protozoan, and the methods to be employed in tracing it are now very fully known, thanks to the investigations cited below. The subject is one of special interest to the teacher as well as to the investigator, since it illustrates one of the simplest life-cycles known to us, and since the mode of development and propagation rises somewhat higher than in typical unicellular Protozoa.

*Habitat.*—Hind-gut of batrachians (also found in planarians and Naideæ).

*Period of reproduction.*—Early spring, beginning as soon as the host leaves its winter quarters for the open water, and continuing only a few weeks in some species, while lasting for two to three months in others.

*Mode of reproduction.*—Longitudinal and transverse fission. The adult polynucleated Opalina (*O. caudata* and *O. similis* have generally two nuclei, and occasionally only one) splits up by successive divisions into a large number of parts, each containing, according to the species, one or more nuclei. These parts encyst while in the hind-gut of the host, and are then dropped with the fæces into the water. The spherical cysts (.025-.03$^{mm}$) remain unchanged for several weeks on the bottom, and only begin their development after being swallowed by young tadpoles and passing into the hind-gut.

*Material.*—The adult Opalina may be easily obtained by cutting out the hind-gut of a frog and pressing a little of the contents of the anterior end into a drop of water on a slide. If this is done in early spring, all the phases of fissiparism may be obtained, together with encysted stages. The best time, however, for studying the process of fission is during the winter. If a frog is kept in a warm room twenty-four hours and fed well, it will be found that fission of the Opalinæ, if any are present, has advanced to the point of encysting, and a complete series of stages may be readily obtained.

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[1] Th. W. Engelmann. Ueber Entwickelung u. Fortpflanzung von Infusorien. Morph. Jahrb., I, p. 573, 1875.

Ernst Zeller. Untersuchungen über die Fortpflanzung und die Entwickelung der in unseren Batrachiern schmarotzenden Opalinen. Zeitschr. f. wiss. Zool., XXIX, p. 352, 1877.

Wilh. Pfitzner. Zur Kenntnis der Kerntheilung bei den Protozoen. Morph. Jahrb., XI, H. 3, p. 454, 1885.

Moritz Nussbaum. Ueber die Theilbarkeit der lebendigen Materie. Arch. f. Mik. Anat., XXVI, pp. 487, 509 and 514, Jan., 1886.

Material for the study of the development is obtained from young tadpoles ($5^{mm}$ and upwards in length) collected from their natural haunts, or better, raised from the egg and fed with Opalina cysts. A few hundred eggs of the frog may be placed in a small aquarium, and at the same time the fæces from several frogs which are known to contain numerous Opalina cysts. Soon after hatching, the tadpoles will begin to eat water plants and animal and vegetable remains of various sorts found on the bottom, and will thus become infected with Opalina cysts.

*Methods of study.*—(*A*) The process of reproduction by fission can be followed best by placing fresh specimens in a drop of a very dilute solution of gum arabic and examining without a cover-glass; or, in a drop of humor aqueus from the frog, in which Nussbaum kept them alive, in one case four days. The humor aqueus should be inclosed air-tight.

(*B*) For the study of the caryokinetic multiplication of nuclei, which is the leading feature in the development of multi-nucleate forms, preparations may be made in the following manner:

(1) Press out a portion of the fæces from the anterior end of the rectum on to a slide, adding a drop of water.

(2) Carefully remove, by the aid of fine forceps, all visible pieces of substance, taking special care to leave no grains of sand, and then cover with a very thin cover-slip. The water added should be just enough to fill the space beneath the cover without flowing beyond its edges, and the space as thin as possible in order that the larger Opalina may be under slight pressure.

(3) By means of a brush make a border of picric acid (saturated aqueous solution) all around the cover, and leave the slide thus prepared in a moist chamber for one or two days, giving time for the acid to penetrate slowly and evenly from all sides.

(4) Wash with distilled water until the Opalina are completely colorless, allowing the water to work slowly under from one side of the cover, while it is drawn away with blotting paper from the opposite side. Great care should be taken not to add the water more rapidly than it is drawn away, as the raising of the cover would allow the Opalinæ to float away. The process of washing requires several hours, and must be closely watched from beginning to end.

(5) Stain with Grenacher's alum carmine or hæmatoxylin, drawing a border of the dye around the cover, as was done with

picric acid; then leave in moist chamber for a few hours (hæmatoxylin), or one or more days (alum carmine).

(6) Wash with distilled water, proceeding as in No. 4.

(7) Dehydrate with absolute alcohol, taking care not to disturb the cover, and then add a border of clove oil. The alcohol soon evaporates and is replaced with the clarifying medium. The preparation is now ready for examination. If the preparation is to be preserved permanently the clove oil should be replaced by xylol, and then a thin solution of balsam in xylol allowed to flow under the cover as the xylol evaporates. As a good preparation is often spoiled in the process of mounting, it is well to make the examination in clove oil first.

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## SCIENTIFIC NEWS.

— Dr. C. V. Riley, entomologist of the Department of Agriculture and honorary curator of insects in the National Museum, has presented to the National Museum his extensive private collection of North American insects, representing the fruits of his labors in collecting and study for over twenty-five years. His collection contains over 20,000 species, represented by over 115,000 pinned specimens, and much additional material preserved in alcohol or other methods. It is estimated by those familiar with the collection to have a money value of at least $25,000. In addition to the actual cost of material it is hard to estimate the amount of time and labor that such a collection represents. In acknowledging the donation, Professor Baird expresses the warmest appreciation for this most generous gift, and his assurance that both now and in the future it will afford a valuable means of study for the entomologists of this country. This collection is especially rich in Coleoptera and Lepidoptera, and the latter contains many rare larvæ, blown and in alcohol. As it stands, by this gift the entomological collections of the National Museum become next in importance to those at Cambridge.

— The anniversary meeting of the Royal Microscopical Society was held in January, when the president (Dr. Dallinger, F.R.S.) delivered an address dealing with the results he had obtained during the last four years principally in the employment of the greatly improved microscope object-glasses made on the homogeneous-immersion principle. The special research which Dr. Dallinger has been engaged upon, and to which his address was devoted, is the elucidation of the origin, development, division and ultimate function of the nucleus, as found in what may be assumed to be its simplest condition in the more striking of the septic organisms, and his microscopical observations have been chiefly made on the living organism. The object-glasses employed by Dr. Dallinger are high powers of most recent construction, in which the apertures have been carried to the highest